

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PE1127	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/IE 00/00110	International filing date (<i>day/month/year</i>) 25/09/2000	(Earliest) Priority Date (<i>day/month/year</i>) 23/09/1999
Applicant THE PROVOST FELLOWS AND SCHOLARS OF THE COLLEGE...		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01S5/10 H01S5/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, PAJ, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KOZLOWSKI D A ET AL: "SINGLEMODE 1.3 M FABRY-PEROT LASERS BY MODE SUPPRESSION" ELECTRONICS LETTERS,GB,IEE STEVENAGE, vol. 31, no. 8, 13 April 1995 (1995-04-13), pages 648-650, XP000510095 ISSN: 0013-5194 cited in the application the whole document --- -/--	1,38



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

7 December 2000

Date of mailing of the international search report

22/12/2000

Name and mailing address of the ISA

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 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Claessen, L

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>MCDONALD D ET AL: "PERFORMANCE CHARACTERISTICS OF QUASI-SINGLE LONGITUDINAL-MODE FABRY-PEROT LASERS" IEEE PHOTONICS TECHNOLOGY LETTERS, US, IEEE INC. NEW YORK, vol. 8, no. 9, 1 September 1996 (1996-09-01), pages 1127-1129, XP000624852 ISSN: 1041-1135 cited in the application the whole document</p> <p>---</p>	1, 38
A	<p>DECHIARO L F: "Spectral width reduction in multilongitudinal mode lasers by spatial loss profiling" JOURNAL OF LIGHTWAVE TECHNOLOGY, AUG. 1991, USA, vol. 9, no. 8, pages 975-986, XP002154878 ISSN: 0733-8724 cited in the application the whole document</p> <p>---</p>	1, 38
A	<p>DE 39 14 001 A (SIEMENS AG) 31 October 1990 (1990-10-31) the whole document</p> <p>---</p>	1, 38
A	<p>PATENT ABSTRACTS OF JAPAN vol. 013, no. 144 (E-740), 10 April 1989 (1989-04-10) & JP 63 305582 A (MATSUSHITA ELECTRIC IND CO LTD), 13 December 1988 (1988-12-13) abstract</p> <p>-----</p>	1, 38

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IE 00/00110

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 3914001	A	31-10-1990	NONE	

JP 63305582	A	13-12-1988	NONE	

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 11 July 2001 (11.07.01)	
International application No. PCT/IE00/00110	Applicant's or agent's file reference PE1127
International filing date (day/month/year) 25 September 2000 (25.09.00)	Priority date (day/month/year) 23 September 1999 (23.09.99)
Applicant O'GORMAN, James, Christopher et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 11 April 2001 (11.04.01)

☐ in a notice effecting later election filed with the International Bureau on:


2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Zakaria EL KHODARY Telephone No.: (41-22) 338.83.38
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PE1127	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IE00/00110	International filing date (day/month/year) 25/09/2000	Priority date (day/month/year) 23/09/1999
International Patent Classification (IPC) or national classification and IPC H01S5/10		
Applicant THE PROVOST FELLOWS AND SCHOLARS OF THE COLLEGE...		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 11/04/2001	Date of completion of this report 01.08.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Moskowitz, P Telephone No. +49 89 2399 2521	



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IE00/00110

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-29 as originally filed

Claims, No.:

1-72 as originally filed

Drawings, sheets:

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IE00/00110

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-72
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-72
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-72
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

V.

1. Reference is made to the following document:

D1: KOZLOWSKI D A ET AL: 'SINGLEMODE 1.3 M FABRY-PEROT LASERS BY MODE SUPPRESSION' ELECTRONICS LETTERS,GB,IEE STEVENAGE, vol. 31, no. 8, 13 April 1995 (1995-04-13), pages 648-650, XP000510095 ISSN: 0013-5194 cited in the application.

2. The document D1 is regarded as being the closest prior art to the subject-matter of claims 1 and 38, and shows:

an optical waveguide (in a Fabry Perot semiconductor laser diode) for outputting light of a substantially single predetermined wavelength, the optical waveguide comprising:

a light conducting medium defining a longitudinally extending optical path for guiding the (laser) light, the optical path extending longitudinally between respective spaced apart first and second ends (end facets), and a means for causing partial longitudinal reflections of the light along the optical path at at least two spaced apart partial reflecting locations (three etch pits with periods $i/8$, $i/4$ and $i/2$) along the optical path for deriving light of the predetermined wavelength.

The subject-matter of claims 1 and 38 therefore differs from this known device in that the means for causing the partial reflections locates the reflecting locations along the optical path at distances from the first end along the optical path which are functions of the **effective optical length** of the optical path **taking account of alteration to the actual length of the optical path resulting from the effect of the means for causing the partial reflections on the actual length of the optical path.**

The subject-matter of claims 1 and 38 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may therefore be regarded as providing an optical waveguide with a more stable light output of a substantially single predetermined wavelength.

Since the effective length of the optical path varies depending on the number of partial reflecting locations provided in the optical path, and the effective refractive index of the partial reflecting locations, the partial reflecting locations in the cited prior art devices are not positioned at optimum locations for setting up of standing waves of the desired wavelength or harmonics thereof.

The solution to this problem proposed in claims 1 and 38 of the present application (if claims 1 and 38 are clarified in accordance with **Section VIII** below) is considered as involving an inventive step (Article 33(3) PCT) because none of the cited prior art documents suggests or discloses the subject-matter disclosed in the characterising parts of claims 1 and 38.

3. Claims 2-37 and 39-72 are dependent on claims 1 and 38 respectively, and as such also meet the requirements of the PCT with respect to novelty and inventive step (if claims 1 and 38 are clarified in accordance with **Section VIII** below).

VIII.

1. It is clear from throughout the description that the following feature is essential to the definition of the invention:

(1) the optical distances of the reflecting locations along the optical path from said first end being chosen such that the standing waves set up between said first end and each of said reflecting locations, and the standing wave(s) set up between any two of said reflecting locations, and the standing wave set up between said first and second ends, are all in harmonic relationship with each other.

Since independent claims 1 and 38 do not contain this feature, they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

INTERNATIONAL SEARCH REPORT

Intern: al Application No

PCT/IE 00/00110

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01S5/10 H01S5/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, PAJ, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KOZLOWSKI D A ET AL: "SINGLEMODE 1.3 M FABRY-PEROT LASERS BY MODE SUPPRESSION" ELECTRONICS LETTERS,GB,IEE STEVENAGE, vol. 31, no. 8, 13 April 1995 (1995-04-13), pages 648-650, XP000510095 ISSN: 0013-5194 cited in the application the whole document --- -/--	1,38



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

7 December 2000

Date of mailing of the international search report

22/12/2000

Name and mailing address of the ISA

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NL - 2280 HV Rijswijk
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Fax: (+31-70) 340-3016

Authorized officer

Claessen, L

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern: al Application No

PCT/IE 00/00110

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3914001 A	31-10-1990	NONE	
JP 63305582 A	13-12-1988	NONE	

INTERNATIONAL SEARCH REPORT

Intern: al Application No

PCT/IE 00/00110

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01S5/10 H01S5/40

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B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
IPC 7 H01S

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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- *Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Fax: (+31-70) 340-3016

Authorized officer

Claessen, L

INTERNATIONAL SEARCH REPORT

Intern: al Application No

PCT/IE 00/00110

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	<p>MCDONALD D ET AL: "PERFORMANCE CHARACTERISTICS OF QUASI-SINGLE LONGITUDINAL-MODE FABRY-PEROT LASERS" IEEE PHOTONICS TECHNOLOGY LETTERS, US, IEEE INC. NEW YORK, vol. 8, no. 9, 1 September 1996 (1996-09-01), pages 1127-1129, XP000624852 ISSN: 1041-1135 cited in the application the whole document</p> <p>---</p>	1,38
A	<p>DECHIARO L F: "Spectral width reduction in multilongitudinal mode lasers by spatial loss profiling" JOURNAL OF LIGHTWAVE TECHNOLOGY, AUG. 1991, USA, vol. 9, no. 8, pages 975-986, XP002154878 ISSN: 0733-8724 cited in the application the whole document</p> <p>---</p>	1,38
A	<p>DE 39 14 001 A (SIEMENS AG) 31 October 1990 (1990-10-31) the whole document</p> <p>---</p>	1,38
A	<p>PATENT ABSTRACTS OF JAPAN vol. 013, no. 144 (E-740), 10 April 1989 (1989-04-10) & JP 63 305582 A (MATSUSHITA ELECTRIC IND CO.LTD), 13 December 1988 (1988-12-13) abstract</p> <p>-----</p>	1,38

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern: al Application No

PCT/IE 00/00110

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3914001 A	31-10-1990	NONE	
JP 63305582 A	13-12-1988	NONE	